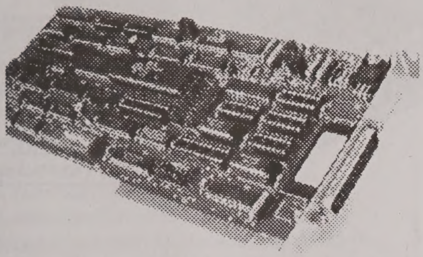
PacComm

Amateur Radio Products



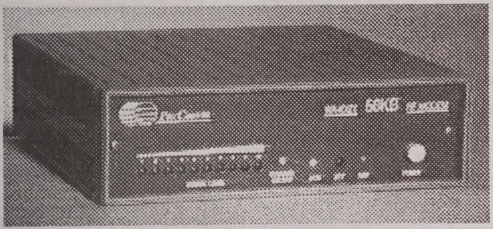
NetworkComponents

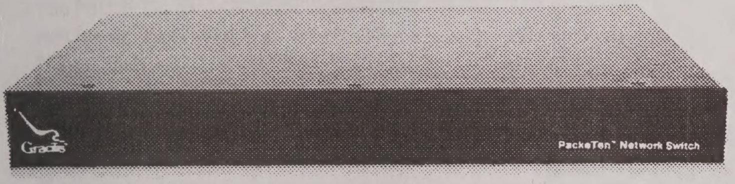
Satellite Communication

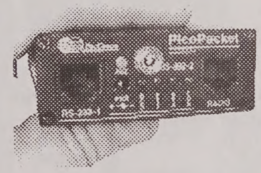
GPS TNCs, Receivers, Antennas

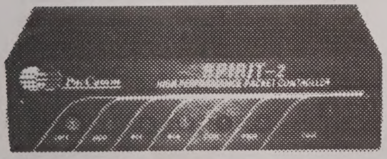
Advanced HF Digital Modems

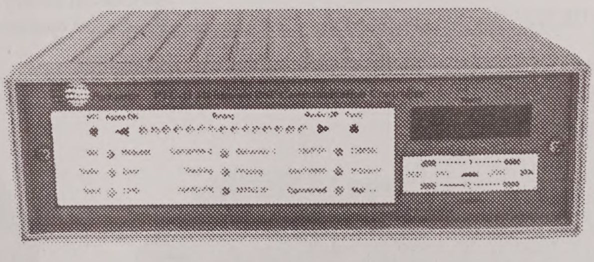
Tools, Accessories, Software

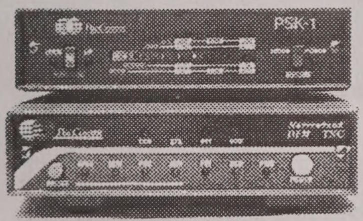












The **PicoPacket** Miniature TNC Family

The PicoPackets are exciting and innovative TNCs. Inexpensive too! On-Line HELP makes this the perfect beginners' TNC. So easy to learn!

Some Unique features of the PicoPacket

- On-Line Help.
- Full-time second port option available.
- Only 1.0 x 2.5 x 3.25 in / 25 x 63 x 83 mm (standard model).
- Slide-on battery pack option.
- Open squelch DCD circuit (optional on standard model, included on other models).
- Optional internal GPS receiver.

Compact!

Standard model only 1" x 2.5" x 3.25". An inch shorter than a pack of cigarettes.

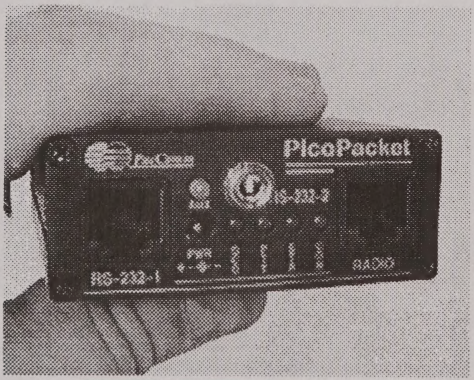
Powerful!

Z-181 high integration MPU with one megabyte address space. A powerhouse.

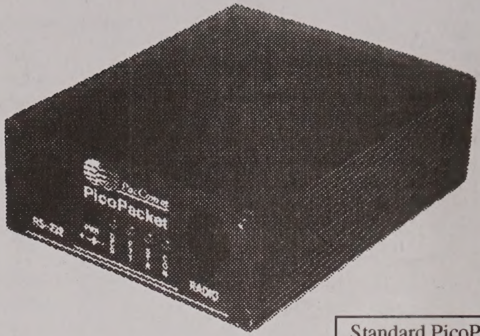
Inexpensive!

Only US $129 (Standard model, 32k RAM).

Terminal programs for both DOS and Windows included (may be shareware or demo versions).



PicoPacket with Second Serial Port for GPS or Telemetry Input



Standard PicoPacket.

Complete!

Instruction manual, schematic, Quick Command listing, power cord, 2 radio cables , serial cable and DE-9S adapter included.

RJ-45 radio cables are made of "real" copper wire - solders easily to radio connectors (radio connectors not included).

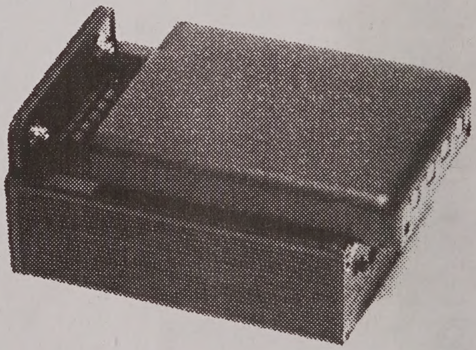
EPROM and RAM are socketed for ease in upgrading firmware and adding the optional 128k RAM. Memory backup battery is socketed.

Personal Message System with all the state-of-the-art features. 64k of message storage area in the 128k RAM model, plus large I/O buffers.

Battery Pack Option

Each PicoPacket model (Standard, Second Serial Port, Internal GPS) may be ordered with or without the battery pack.

The case of the all battery pack models fit a quick-change 6VDC slide-on/slide-off battery pack which allows continuous operation. The PicoPacket contains a built-in battery charging circuit.



PicoPacket Battery Pack Model showing Partially Installed Battery Pack and PicoPacket Contacts.

GPS Ready!

The PicoPacket firmware has many features for convenient operation with a GPS receiver.

APRS Support

Full support for APRS (the Automatic Position Reporting System) built-in. Works with APRS through either the standard single serial port or the optional second serial port.

The PicoPacket and APRS work together so that when the Pico with a GPS receiver (internal or external) is controlled by APRS it sends no location beacons except as commanded by APRS. When the APRS computer is disconnected, the PicoPacket automatically becomes a 'Tracker' sending out location beacons at specified intervals.

PicoPacket GPS Models

The PicoPacket model with the second serial port option is the ideal TNC for use with a handheld GPS receiver, handheld radio, and laptop (or smaller) computer for APRS. activity. One serial port for the computer, a second one for the GPS.

If you get the battery pack model, each unit has its own power. Neat and convenient.

The Second Serial Port option also provides a real-time clock and 128k RAM.

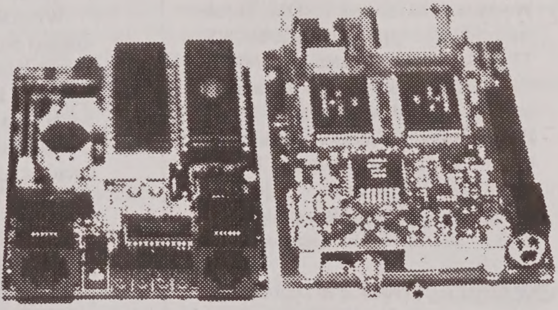
A second RS-232 serial port for the PicoPacket allows both a GPS and computer to be attached to the PicoPacket at the same time. Eliminates the need for a hardware port switch adapter.

The PicoPacket with the internal GPS receiver is completely self contained in a package under 2.5 x 2.5 x 3.25 inches. Just connect to a handheld radio and you have a complete tracking unit with a full-time serial port to connect to your notebook PC.

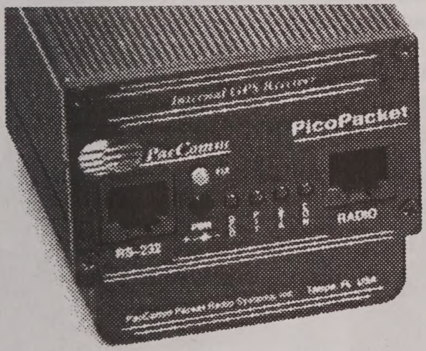
The mag-mount GPS antenna has a footprint less than two inches in diameter, yet it tracks GPS satellites noticeably better than handheld GPS units.

The GPS model has a Trimble SVee6-CM3 GPS receiver fitted directly into the PicoPacket. It uses a support/carrier board to perform the functions of physically supporting the GPS receiver, voltage regulation, and backup battery for the GPS.

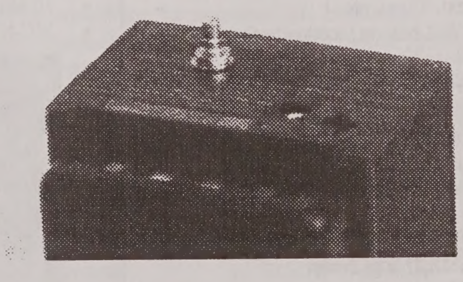
The PicoPacket with internal GPS receiver includes the second serial port option features, but the second serial port is dedicated to the GPS receiver and is not accessable for other purposes.



PicoPacket Circuit Board (left) and Trimble SVee6 GPS receiver mounted on PacComm Support Board (right)



Front view of PicoPacket with Internal GPS Receiver and Battery Pack



GPS Antenna Connector on Rear of PicoPacket/GPS with Battery Pack

The TINY-2 MK-2 Multipurpose TNC

The TINY-2 MK-2 is a 1200 baud AFSK TNC which may be used in many ways in the amateur radio world. It is low priced, but a quality product.

A great 'first TNC'

- Easy to use. Normal operation uses less than ten commands.
- PacComm's Personal Message System local mailbox with automatic forwarding features.
- GPS features included in standard model.

A network node

- Works with ROSE, NET/ROM, TheNet and all TNC-2 type network EPROMS.
- TINY-2 may be upgraded to 9.8MHz CPU clock speed for heavy channel use or for data speed of 9600 bps or higher.
- Factory installed accessory modem header takes all PacComm and TAPR compatible modem cards.
- TINY-2/NODE model is supplied without an EPROM for user installed node firmware.
- Optional AD-4 Analog to Digital board for use with TheNet X1J firmware.

A GPS Tracker TNC

- APRS (Amateur Packet Reporting System) support features are standard.
- Places GPS location string into CText, LText, SText, etc.
  - Will beacon location periodically.
  - May be polled for position.
  - Responds to ?APRS? queries.
- Available with internal GPS receiver.
- Switch from using your TINY-2 as a regular TNC to a remote vehicle tracker by executing one command.

Advanced Applications

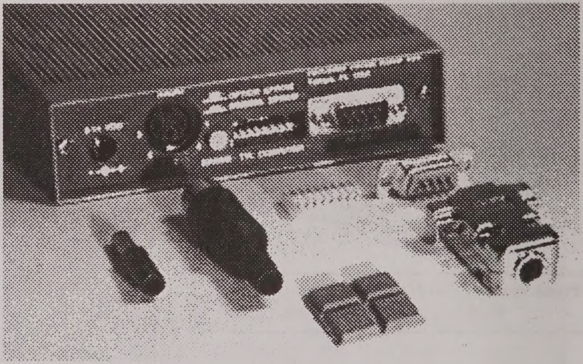
- WA8DED host mode.
- KISS mode for satellite and TCP/IP.
- Telemetry via RS-232 or TTL port.
- Packet communication for a weather node.

Features

- TNC-2 EPROM compatible
- Low power consumption: 45 mA.
- 32k RAM. Over 13k message storage.
- Multicolored LED's - PWR (Power), CON (Connect), STA (Status), Push-to-talk (PTT), Data Carrier Detect (DCD).
- LED Message waiting indicator.
- 64kB EPROM contains two images selected by rear panel switch.
  - PacComm's firmware.
  - WA8DED host mode.
- Rugged extruded case - 5 x 7 x 1 3/8 ins (130x180x35mm). Grey epoxy finish. Weight 18 oz. (500g).
- Both TTL level and RS-232 level serial ports to computer/terminal. Serial rates of 300 to 38.4k baud, jumper selected.
- Comprehensive User's Manual, Command Reference Card, complete circuit schematics provided.
- All mating connectors provided.
  - Power plug (2.1 mm).
  - 5 pin DIN plug.
  - RS-232 solder cup connector and hood.
  - 8 pin in-line connector provided for TTL connections.

Options *(Available at extra cost)*

- 64 kB memory expansion.
- Digital DCD accessory for open squelch radio operation.
- Hardware clock accessory for time retention when power is off.
- AD-4 Analog-to-Digital conversion board for use with TheNet X1J.
- 10 Mhz CPU speed. Faster CPU, SIO, and EPROM components.
- MC-NB96 G3RUH DFM modem upgrade cards - 9600 or 19200 bps.

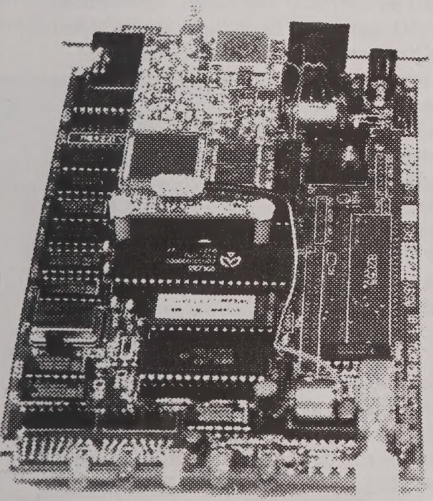


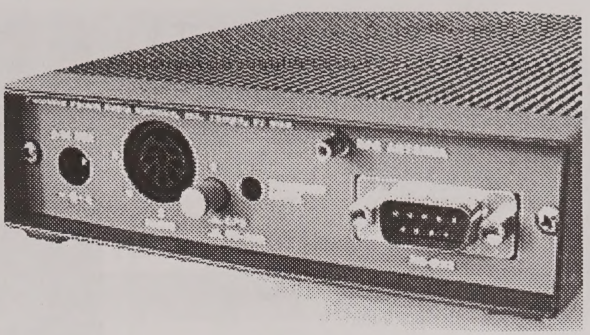
The TINY-2 MK-2/GPS Tracker

Want to experiment with Automatic Position Reporting System (APRS) tracking of your boat or vehicle? The TINY-2 MK-2/GPS integrates a Trimble SVee6-CM3 OEM GPS module inside the TINY-2 case for convenient and troublefree operation.

Firmware Features

- Switch from using your TINY-2 as a regular TNC to a remote vehicle tracker by executing one simple command.
- PacComm's latest firmware including Personal Message System local mailbox.
- NMEA command structure compatible. Uses any NMEA GPS output string to place latitude, longitude and satellite availability into CText, LText, SText, etc.
- A dedicated 'beacon function' is available for location information. LOCATION command (like BEACON command), LTEXT (like BTEXT), LPATH (like UNPROTO).
- Select decoding ANY NMEA GPS output string with the GPSTEXT command.
- The GPSITEXT command allows sending a custom configuration string to the GPS at power-up for custom applications.
- Responds to ?APRS? queries.
- Takes up to 4 callsign aliases.

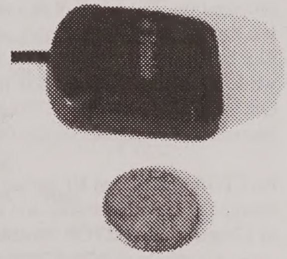




Hardware features

- Low power consumption: TNC, GPS & antenna: 280 mA.
- Options: Open Squelch DCD Adapter, Hardware Clock.
- SVee6-CM3 GPS bolts securely to mounting holes on the TINY-2 circuit board.
- The EPROM switch on the TINY-2 is converted to use as a Terminal/GPS switch. Set the switch one way and you can program the TINY-2 with commands, set the switch the other way and the GPS is connected and automatically updating the TINY-2 buffers.
- A differential GPS version of the Trimble GPS is available at a small additional cost. The unit monitors the packet channel for DGPS updates while also transmitting its own position.
- The TINY-2/GPS is supplied with an active antenna (mag-mount) which is more sensitive than hand-held units. The antenna has a 15ft lead for convenient placement on any vehicle.

GPS Antenna Available



The Trimble active GPS antenna pictured above is available for purchase separately for use with hand-held GPS receivers. Trimble's OEM miniature GPS antenna featurs a 25 dB LNA, small size (47 mm x 40 mm x 13.3 mm, 180 gms.), magnetic mounting, and a 5 meter cable. This weatherproof antenna is designed to operate with or without a ground plane and includes filters for improved jam immunity.

Total specification (through antenna, LNA, cable,& connector):

• Frequency Range	1,575.42 +/- 1.023 MHz
• Gain ground	23dBi MIN (on 65 x 65 mm plane, -40 to +80C)
• Noise Figure	1.6 dB MAX (+23C) 2.3 dB MAX (+80C)
• Output Impedence	50 Ohms
• VSWR	2.0 MAX
Out of band rejection	+/- 20 MHz 7dB MIN +/- 30 MHz 12 dB MIN +/- 50 Mhz 20 dB MIN +/- 100 MHz 30 dB MIN

The PacComm PacTOR Controller

What is PACTOR?

PACTOR is a robust ARQ radio-teletype mode developed by German amateurs, in particular DL6MAA and DF4KV. It was designed to overcome the shortcomings of packet and AMTOR in HF operation.

AMTOR (based on SITOR) was specifically developed for HF radio text communication. Even during very poor signal-to-noise conditions a useable connection can be maintained when a packet connection would be impossible. However, 5-level code is used making binary data difficult to send and error detection is rather weak leading to 12% chance of bad characters. Effective throughput is only 35 baud.

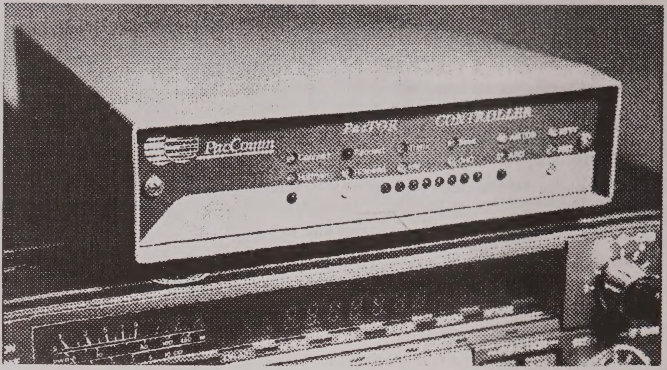
PACTOR provides a more robust error correction scheme and better throughput than AMTOR. The synchronous transmission format and short frame size of AMTOR are retained for excellent performance under poor propagation. The result of this protocol design is a hardware/software system which gives a four-fold throughput increase over AMTOR while continuing to be useable for typical ham QSOs as RTTY and AMTOR operators have become accustomed to.

PACTOR requires an HF radio capable of changing between transmit and receive modes in 130 ms. Any AMTOR capable radio will operate properly with PACTOR.

PacComm's PacTOR Controller

The PacComm PacTOR Controller is produced under license from the German developers. It uses the German firmware with all commands and messages in English.

The PacTOR unit also supports AMTOR and RTTY operation making it ideal for all data modes of HF operation. PacTOR will accept a call in either PACTOR or AMTOR and automatically respond in the correct mode. PacTOR commands are similar to packet commands and are easy to learn and use. Complete amateur callsigns are supported.



An internal mailbox is accessible from either PACTOR or AMTOR modes. Many file and message handling functions are supported.

PacComm's PacTOR unit is capable of either 'high tones' or 'low tones.' Tone pairs are user selectable by internal jumper settings. All filters are adjustable for optimum performance at the tone frequencies selected.

PacComm's PacTOR however, is not an exact reproduction of the German hardware. In fact it is a complete redesign of that unit. Our unit has received excellent reviews from QST, QEX, Ham Radio Today (UK), RTTY Digital Journal, etc.

The modem section of our unit performs exceptionally well because of careful groundplane layout and lack of proximity to the digital section of the unit. This results in superior signal-to-noise performance and extended connects under adverse band conditions. PacComm's unit beats the others by at least 6dB in this respect.

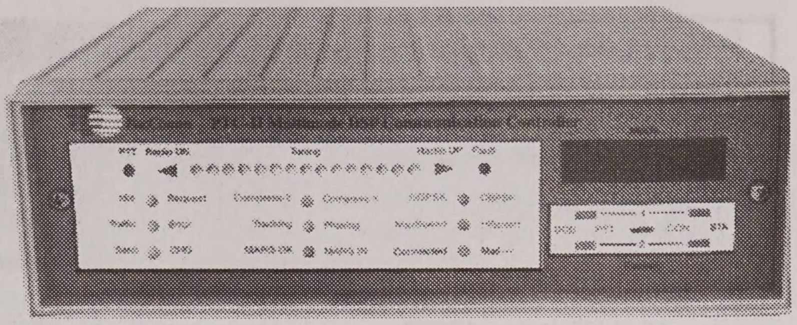
Memory ARQ

One of the key features of the PACTOR mode is Memory-ARQ. Copies of corrupted frames are saved and are correlated with frames received later. The key to proper Memory-ARQ operation is having an analog to digital converter (ADC) - an item of hardware. The ADC converts the actual strength of each received bit into an 8 bit value which is stored in memory for later comparison. Thus each bit can have an exact representation of its received value. If Memory-ARQ is attempted without the ADC, the value of each bit must be rounded down to a zero or up to a one to be stored and the 'marginal value' of the signal is lost. Most anyone's implementation of PACTOR will work fine under good conditions. When the QRM is tough and the band is fading, the PacComm PACTOR will continue to decode signals too weak to hear. The 'software PACTOR' units will have long since lost the connection. Doing it 'right' costs more, but the performance improvement is worth the cost.

Terminal Program

PacTOR is designed to be used with conventional RS-232 ASCII terminals or personal computers running terminal emulator software. PacComm supplies a diskette with each PacTOR unit which contains the Meister Term (MT) public domain terminal program specifically designed for the PacComm PacTOR unit. PacComm's PacketPet for Windows terminal program also supports PacTOR usage.

The PacComm PTC-II Multimode DSP Communication Controller



The PTC-II is a new multi-mode controller and "communications platform" which contains very powerful and flexible hardware and firmware.

It is built in the United States by PacComm under license from S.C.S., the group that developed the original PACTOR and PACTOR-II.

The PTC-II offers the most robust HF digital protocol available to radio amateurs, but it should not be overlooked that the PTC-II is configurable as a triple-port multimode controller supporting packet data rates of 1200 and 9600 bps and numerous other modes.

What is PACTOR-II?

PACTOR-II is a communication system. There is a unique protocol, carefully designed and optimized for excellent HF performance, new and powerful modems realized via Digital Signal Processing, and a hardware platform to allow the firmware to realizeits full operating potential.

PACTOR-II is the name of the new protocol including modulation specifications.

PTC-II is the name of this specific hardware realization of the PACTOR-II architecture.

PACTOR-II features and advantages

- A step-synchronous ARQ protocol.
- Full support of memory ARQ.
- Independent of sideband; no mark/space onvention.
- Center frequency adjustable between 400 and 2600 Hz to exactly match your radio's filters.
- Long-path capability for worldwide connectivity.
- Full compatibility with the original PACTOR-I, AMTOR, and RTTY.
- All-mode mailbox with up to 32 megabytes of storage.
- Automatic switching between Level-1 (PACTOR-I) and Level-2 (PACTOR-II) at contact initiation.
- Occupies a bandwidth of under 500 Hz - use your 500 Hz CW filters.
- Constant bandwidth irrespective of actual transmission speed.
- Differential Phase Shift Keying with two continuously transmitted carriers. 100 symbols per second.
    - DBPSK modulation yields 200 bps (uncompressed).
    - DQPSK modulation yields 400 bps (uncompressed).
    - 8-DPSK modulation yields 600 bps (uncompressed).
    - 16-DPSK modulation yields 800 bps (uncompressed).
- Powerful Forward Error Correction (FEC):
    - High performance convolutional coding.
    - Constraint length of 9.
    - Viterbi decoding using soft decision point.
    - Coding rate varies between 1/2 and 7/8.
- Intelligent data compression monitors compression ratio and self-bypasses if not being effective.
    - Huffmann compression for English or German text.
    - Markov (2 level Huffmann) compression.
    - Run-Length encoding for repeated sequences.
- 10 character MODE display, numerous multi-colored LED tuning and status displays.
- **Watchdog timer on HF PTT port (PacComm exclusive).**
- Specialized communication program provided.
- Firmware contained in Flash memory. Easy upgrade.

Packet modem add-in boards will be announced later. Packet modems are optional at extra cost.

Gracilis Products by PacComm - TCP/IP Solutions

PacComm now manufactures and supports the Gracilis product line. Gracilis engineers provide software support.

These products allow the serious radio network user to use AX.25, NET/ROM, and TCP/IP protocols simultaneously.

The PackeTwin is a two channel communications controller (HDLC) card for use in the 8 bit ISA PC bus. It uses the 85230 Enhanced Serial Communication Controller.

The PackeTwin supports one DMA channel and one polled channel. Uses only one PC interrupt (IRQ) for both channels.

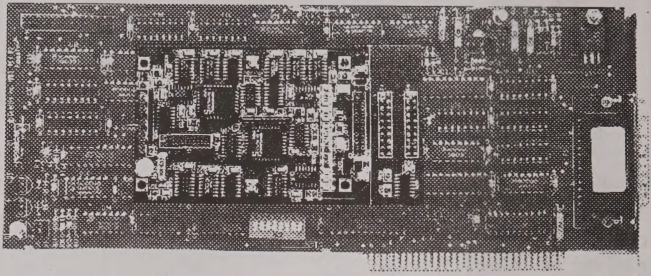
It will operate two asynchronous (RS-232/422) channels or one asynchronous channel and one radio channel. Both ports are configured with RS-232 drivers , but RS-422 drivers are available on special order.

Hardware watchdog timers are provided on both ports.

The PackeTwin can drive external modems on both ports, or support one 9600/19200 DFM modem on a daughterboard and one external modem.

Device drivers are available to support the KA9Q NOS and FTP Software, LINUX, and PC/TCP for Microsoft Windows and DOS.

The PackeTwin supports internal or external clocking, NRZ or NRZI.



PackeTwin card with PacComm surface mount 19k2 DFM modem.

The Gracilis PackeTen Network Switch is a high-speed multiport packet radio data switch compatible with AX.25, NET/ROM, and TCP/IP protocols. By combining CISC/RISC processing technology with network compatibility, the PackeTen is capable of supporting today's services with the performance and features required of tomorrow's networks.

The PackeTen (P-10) uses the Motorola 68302 multiport procesor which is capable of megabit data speeds on three channels. The P-10 may be configured for five asynchronous (RS-232/422) wireline channels or four synchronous (radio) channels or any combination.

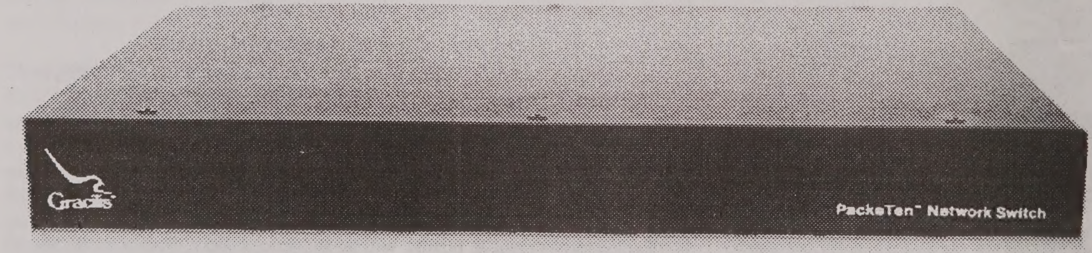
Standard firmware provides full support for ARP, ARPA/Berkeley services and SMTP, allowing full gateway bridging from the Ethernet/UNIX environment, the radio circuit, and the Internet.

A user conference mode is also available for non-host related data transfers.

Configurations

Both of these products may be fitted with PacComm modems which use AFSK, MSK or DFM modulation, and operate at speeds from 1200bps to 64kbps. Both also will drive the PacComm WA4DSY 56kb MSK modem.

The PackeTwin makes an ideal single user support card for the PacComm WA4DSY 56kb MSK modem. Drive the 56kB modem via the DMA channel and use the interrupt driven channel for 9600/19200 DFM operation.



The *NEW* WA4DSY 56kb RF Modem

A modernized version of the famous 56kb MSK modem designed by Dale Heatherington, WA4DSY. Licensed by PacComm.

WA4DSY designed a 56kb MSK RF modem in the late '80s which has been used successfully in the Atlanta and Ottawa areas. The modem was sold as a kit by the GRAPES club in Atlanta, and is often called the GRAPES modem.

The new design is a single PC board. Parts count is greatly reduced. Many tune up and operational conveniences have been added.
This modem must be used with a transverter for the desired frequency band.

- Power requirments: +12 VDC @ 300mA.
- Packaged in a PacComm extruded case 7.25" wide x 7.25" deep x 1.5" high.
- Optional 12 volt, 30 W. switching supply. (Powers both modem and transverter).

Interface connections

Power:	2.1mm round connector
Electrical:	Balanced RS-422 or CMOS
Physical:	DA15 female
IF in/out:	BNC
Transverter:	5 pin DIN, female.

Performance

IF Freq:	29-30 MHz
Output Power:	adj 0.1mW to 2mW
Freq. control:	Synthesizer 1 kHz steps
key up delay:	0 ms
RX DCD time:	3 ms
Total delay:	3 ms

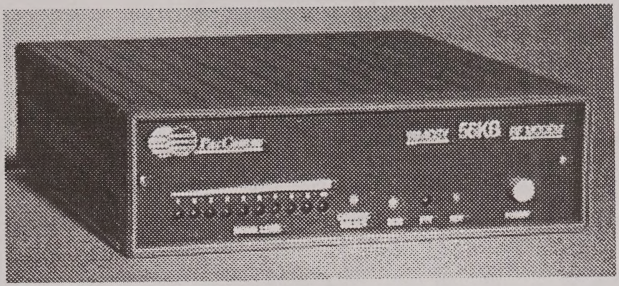
Features

Remote reset system

Allows a remote site computer to be reset by remote control.

Built in FIFO bit regenerator

Allows the modem to become a full duplex bit repeater with no additional hardware. The RS422 interface remains fully functional when the bit repeater is enabled.



Watchdog timer

A 2 second watchdog timer turns off PTT after 2 seconds. Resets when RTS goes false. Can be disabled .

Built in tuning aids

In "tune up mode" the transmitter becomes a sweep generator to allow tuning the RF coils properly using only a dual trace 30 MHz scope.

LEDs

Ten LED signal strength display. LEDs for READY, PTT, and DCD. There is 1 internal LED which indicates when the Remote Reset Relay is closed.

Switches

Front panel: Power switch (push on - push off), rotary hex frequency selector. Rear Panel: KEY TX : activates transmitter and sends scrambled ones. REMOTE RESET: Sends remote reset code.

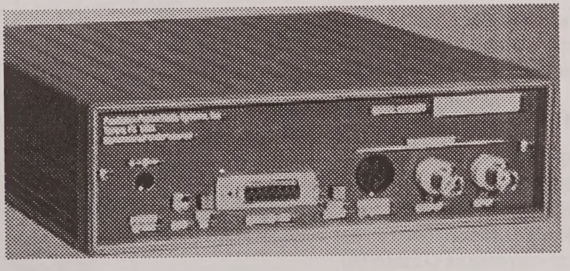
Technology

All the digital logic is implemented in a single Xilinx XC3042A-7 chip packaged in an 84 pin PLCC. Data carrier detection is done digitally in the Xilinx chip. User transmit data is scrambled (x17 + x5 +1) and converted to NRZI.

A 27C256 EPROM holds both the Xilinx chip programing data and all the state machine and waveform tables for the modem transmitter. It also holds the data which is loaded into the frequency synthesizer at power up. Transmit and receive frequencies are programmed independently.

The only adjustments involve tuning the filters. The special tuning mode should make that task simple. The transmitter signal is compatible with existing 56kB WA4DSY modems.

Drive the 56kb modem with a Gracilis PackeTwin HDLC card or, (for stand alone operation), a PacComm SPIRIT-2 PAD or a Gracilis PackeTen.



The SPIRIT-2 High Performance Packet Controller

The SPIRIT-2 is the ideal TNC for the modern (9600 bps & faster) packet station & for BBS, satellite and Network use. It uses reliable, proven technology (G3RUH modem, TNC-2 CPU architecture) with large-scale programmable logic circuits for solid, reliable performance.

PacComm firmware uses TAPR style commands with PacComm extensions, including KISS and Personal Message System.

512kbit (64k Byte) EPROM with bank-switching circuit for TheNet or ROSE network firmware. No modifications required, just set jumpers. TNC-2 compatible design works with any TNC-2 EPROM.

64k of Personal Message System storage and large send and receive buffers.

9.8 MHz CPU clock speed and 10 MHz rated parts are standard. 20 MHz CPU option. Terminal baud rates from 9.6 kb up to 57.6 kb for satellite file downloads without dropped frames.

G3RUH design modem with PLL demodulation for outstanding performance. Two independent modem transmit and receive filter sections. Radio baud rates from 4.8 kb up to 57.6 kb are supported. (64kb on special order.)

User Features

Six LEDs. Power (red), Connect (green), Status (yellow), Push to Talk (red), DCD (green) and OPT (a multi-purpose dual color LED). When used with the CoaxLAN, red and green indicate transmit and receive data on the LAN.

Black anodized aluminum case; rugged, attractive, and RFI/EMI resistant.
Extensive RFI/EMI filtering.

Reliability Features

Radio and serial port lines are extensively filtered against RF and noise effects.
Major RS-232 and radio lines and power feed are protected against power spikes with on-board surge surpressors (Transorbs).

Network Features

- TNC-2 EPROM compatible, TheNET X1, ROSE, and TEXNET ready, Processing power and modem performance for serious throughput.
- PacComm's CoaxLAN circuit is built in for easily inter-connecting multiple SPIRIT-2s in node stacks.

Standard Model: 128k RAM. PacComm PMS firmware. Main modem filters configured for 9600 bps. Auxiliary modem filters unconfigured.

Satellite Model: 128k RAM. PacComm PMS Firmware. Modem filters for 9.6 and 38.4 kbps. Other speeds upon request.

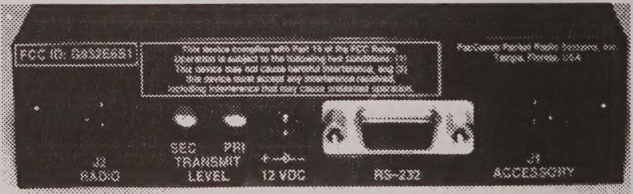
Node Model: 32k RAM. 27C512 EPROM with PacComm Diagnostic Monitor firmware. Factory burned TheNet X1J or ROSE at extra charge. Modem configured for 9.6 and 38.4 kbps. Other speeds upon request.

Node Model/20 Mhz: 20 MHz CPU running at 19.6 Mhz. Modem filters for 9.6 and 19.2 kb. Other speeds upon request.

Backbone Model: PacComm Diagnostic Monitor EPROM. Factory burned TheNet X1J or ROSE at extra charge. 20 MHz CPU running 19.6 Mhz. Modem filters for 38.4 and 57.6 kb. Other speeds upon request.

PAD Model: The SPIRIT-PAD is a 20 MHz Backbone model with no modems fitted. Drives the WA4DSY 56kB MSK modem. Can be set up for NRZ or NRZI, internal or external clocking.

The SPIRIT-2 comes with:
Operating Manual with 'Quick-Start section' (Standard and Satellite models), Hardware Manual with all schematics, Computer cable for 9 pin PC serial port, Unterminated radio cable, Power supply (120VAC to 12VDC), Accessory socket cable plug.



TNC-NB96 and PSK-1 Satellite Modem Combo

These two units are designed to work together to make a complete packet station for both the 1200 bps PSK and 9600 bps satellites. When ordered as a combination, they are provided with premade interconnection cables. Only the radio attachment cable needs to be terminated.

All satellite and terrestrial modes are selected by push buttons. Supports 1200 bps AFSK, 1200 bps PSK, 9600 bps DFM.

TNC-NB96 1200/9600 Baud TNC

The TNC-NB96 consists of a TINY-2 MK-2 TNC with open squelch adapter and a G3RUH DFM modem.

A front panel push button switch selects between 1200 AFSK, 9600 DFM, 1200 baud PSK (if PSK-1 is attached) and whatever modem is connected to the rear-panel modem accessory connector.

The TNC-NB96 is the perfect companion to the PSK-1 Satellite Modem. The switching circuitry in the TNC-NB96 and the PSK-1 operate together to allow access to the 1200 bps Microsats and the 9600 bps UoSATs through the same multimode transceiver.

TNC-NB96 Features

- G3RUH design modem provides excellent 9600 bps performance.
  - Jumper configurable for 19,200 bps.
- Rear panel accessible TAPR-style modem disconnect header.
- 32k non-volatile RAM. Provides over 14k message storage.
- LED Message waiting indicator.
- 64kB EPROM contains two 32kB EPROM images (selectable by rear panel switch).
  1. PacComm's latest firmware including Personal Message System local mailbox
  2. WA8DED host mode.
- 1200 bps AFSK port has digital DCD adapter for use with unsquelched radios.
- Rugged extruded case - 6 x 7 x 1 7/8 inches. Grey epoxy finish. Weight 35 oz. (1kg).
- Serial rates of 300 to 38.4k baud, jumper selected.

PSK-1 Packet Satellite Modem

The PSK-1 converts a standard 1200 baud AFSK TNC which has an accessory modem header to operate with packet satellites. It provides 1200 baud Manchester encoded AFSK output for satellite uplink and decodes 1200 baud PSK signals downlink signals. Also decodes 400 baud telemetry from Oscar 10 and 13.

Transmits and receives 1200 baud PSK for terrestrial HF use.

PSK-1 Features

- All modes and functions selected by front panel push buttons, or by menus if the computer control port is used.
- Switching between standard packet and satellite operation by push button or computer command.
- Excellent sensitivity.
- Wide range Automatic Gain Control circuit.
- Automatically tunes downlink radio via UP/DOWN control lines to compensate for Doppler frequency shift.
- Interfaces easily to the PacComm TNC-NB96 for 9600 bps and 1200 bps satellite operation.
- LEDs show signal lock and step-up, step-down pulses.
- LED bargraph displays proper signal tuning, also shows mode and functions selected.
- Rear panel connections:
  1. Uplink radio
  2. Downlink radio
  3. TNC radio port
  4. TNC modem disconnect header
  5. Telemetry and control port
  6. Power.
- Operating manual contains detailed installation and interface instructions.

One year factory parts and labor warranty, 30 day return privilege.Shipped with all interconnecting cables, User's Manual, Command Reference Card, and complete schematic diagrams. Power supply provided (North America only).

TEKK Data Radios

TEKK KS-900/900L Specifications (typical of KS-960 and 1000)

General Specifications

FCC ID	GOXKS-900/15.22.90
Frequencies	450-470MHz (KS-900) 430-450MHz (KS-900L)
Operating Temperature	-30 to +60C
Voltage	9.6VDC (7.5 to 12.0)
Dimensions	85 x 52 x 21 mm
Weight	145g
RF Connector	BNC/50 Ohms
Interface Connector	9 pin D

Transmitter

Power output	2W @ 9.6VDC
Modulation	Direct FM
Attack Time (TXD)	8ms
Audio Response	Flat
Distortion	%
Maximum data mod. deviation	50mV for 3.5kHz
Spurious Emissions & Harmonics	<->60dBc

Receiver

Sensitivity	0.35uV
Selectivity	70dB
Spurious Rejection	60dB
Audio Response	Flat
Distortion	5%
Receiver recovery	8ms
Audio output	750mV RMS
Current Drain	20mA

Connector

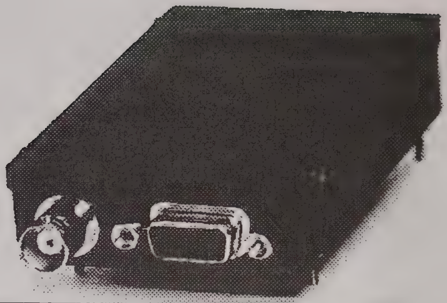
- 1 - +Volts
- 2 - Ground
- 3 - PTT
- 4 - TXA
- 5 - RXA
- 6 - n/c
- 7 - Ground
- 8- RSSI
- 9 - DCD

Transmitter Crystal Specifications

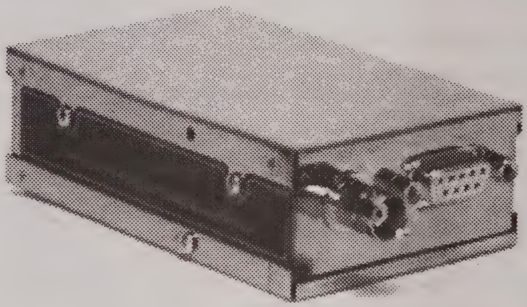
Holder	HC-18/T Wire Lead
Mode of oscillation	Fundamental
Load Capacity	32pF parallel
Series Resistance	20 Ohms
Driver Level	2mW
Holder Capacity	7pF max.
Operating Temperature	-20C to +60C
Frequency Tolerance	+/- 5ppm
Freq Stability	+/- 5ppm
Freq Calculation	(Fc/27)

Receiver Crystal Specifications

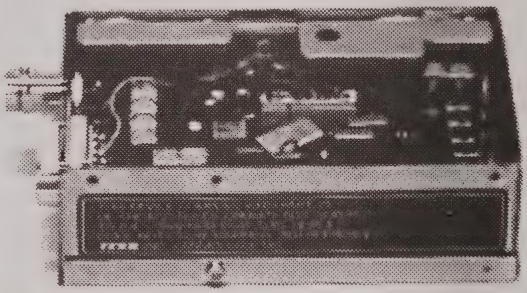
Holder	HC-18/T Wire Lead
Mode of oscillation	Third Overtone
Load Capacity	32pF parallel
Series Resistance	35 Ohms
Driver Level	2mW
Holder Capacity	7pF max.
Operating Temperature	-20C to +60C
Frequency Tolerance	+/- 5ppm
Freq Stability	+/- 5ppm
Freq Calculation	(Fo-21.4)/9



Tekk KS-900/900L



Tekk KS-960/960L/1000/1000L



Tekk KS-1000/1000L 5 Watt UHF Data Radio.
Note beefy heat sink.

PacComm carries all models of TEKK data radios, for both commercial and amateur frequencies. These radios operate quite effectively at 9600 bps using DFM modulation.

PacComm stocks filters to modify the radios for use at 19.2 kbps data rate. The filters are available installed by PacComm or for user installation.

PacComm Amateur Products Price List (as of May 13, 1996)

Packet and PacTOR Controllers

PicoPacket Standard model, 32k RAM	$ 129
Standard model, 128k RAM	$ 149
Standard model, 128k RAM, Open Squelch DCD	$ 164
PicoPacket withBattery Pack, 32k RAM	$ 189
PicoPacket w/Battery Pack and 128k RAM	$ 209
PicoPacket w/Battery Pack, 128k RAM, Open Sq. DCD	$ 224
PicoPacket 2nd Serial Port, RTC, 128k RAM, DCD	$ 189
PicoPacket w/Bty Pk, 2nd Serial Port, RTC, 128k, DCD	$ 249
PicoPacket with Internal GPS receiever	$ 599
Includes all features of the 2nd serial port model	
PicoPacket with Battery Pack and Internal GPS receiver	$ 629
Includes all features of the 2nd serial port model	
Spare battery pack for PicoPacket	$ 29
SPIRIT-2 Standard model	$ 239
Power supply (US only), Operating and Technical manuals, schematic, cables. 9600 modem filter included.	
SPIRIT-2 Satellite Model	$ 249
Power supply (US only), Operating and Technical manuals, schematic, cables. 9600 and 38400 modem filters included.	
SPIRIT-2 Node and Backbone - see Network Products	
TINY-2 MK-2	$ 149
Operating and Technical manuals, schematic, TNC connectors	
10 MHz option, factory installed	add $ 25
'Open Squelch DCD' option	add $ 25
Internal DFM 9600 bps modem card (MC-NB96)	$ 119
TINY-2 MK-2/GPS Tracker	$ 595
Power Supply (US only), TNC manuals, schematics, cables	
TINY-2 /10 MHz with internal GPS and antenna	
'Open Squelch DCD' option	add $ 25
GPS Manual	$ 40
TNC-NB96 Switchable 1200/9600 TNC	$ 289
Power supply (US only), Operating and Technical manuals, schematics, cables	
PSK-1 Packet Satellite Modem	$ 239
Power supply (US only), Operating manual, schematics, serial, radio, and telemetry cables	
Combination, TNC-NB96 and PSK-1, prewired	$ 499
PacTOR Controller (PACTOR, AMTOR, RTTY)	$ 279
Power supply (US only), Operating manual, schematics, cables	
PacTOR-II MultiMode DSP Controller	$ 995
Callfor information about packet modem options	
HandiPacket with all accessories	$ 229
Power supply (US only), Operating and Technical manuals, schematics, cables, belt clip, Velcro ™ straps	
Extra unterminated radio cables - See Cable Section	
TNC-320 HF/VHF Packet Controller	$ 219
Operating and Technical manuals, schematics, TNC connectors	
'Open Squelch DCD' option	add $ 25
Hardware Real-time clock option	add $ 30
PC-320 HF/VHF Internal PC Controller	$ 209
Operating and Technical manuals, schematics, TNC connectors	
'Open Squelch DCD' option	add $ 25
Dual radio cable (6 ft pigtails for radios)	$ 13
Hardware Real-time clock option	add $ 30
Gracilis PackeTwin mfg. by PacComm	$ 229
Dual port HDLC card with DMA, TTL, RS-232 or RS-423	
Surface mount DFM modem for PackeTwin - specify speed - 4800 to 64kb (also fits Kantronics DataEngine)	$ 149
BayMod-9600 9600 bps modem w/BayCom Software	$ 119
Operates from PC parallel port. Manual and diskette. Specify 3.5" or 5.25" disk	
BayMod-9600 without software	$ 99

Node Models & Network Products

Gracilis PackeTen mfg. by PacComm	$1595
Powerful NOS-NET/ROM network switch with up to 5 ports.	
Surface mount DFM modem for PackeTen- specify speed - 4800 to 64kb (also fits Kantronics DataEngine)	$ 149
WA4DSY 56kb MSK RF Modem	$ 349
28-30 MHz RF. Requires transverter to operating frequency.	
SPIRIT-2/Node with blank EPROM	$ 239
Technical manual, schematic, cables, TNC connectors	
SPIRIT-2/Node/20 MHz with blank EPROM	$ 279
Technical manual, schematic, cables, TNC connectors 9600 primary & 19200 secondary filters	
SPIRIT-2/Backbone	$ 279
Technical manual, schematic, cables, TNC connectors	
SPIRIT-2 PAD modemless 20 MHz for WA4DSY modem	$ 229
TINY-2 / Node *without* EPROM	$ 129
Technical manual, schematics, TNC connectors	
'Open Squelch DCD' option	add $ 25
TINY-2/Node /10MHz	$ 149
Technical manual, schematic, TNC connectors	
'Open Squelch DCD' option	add $ 25
MC-NB96 Internal 9600 bps upgrade modem for TINY-2, TNC-200, MFJ, etc.	$ 119
EZ-MATRIX	$ 35
Complete diode matrix kit, uses DIP diode packs	
Radio Multiplier-II	$ 149
Schematic, instructions	
CoaxLAN Adapter, For use with TINY-2 or MFJ **TTL** port	$ 25
Must specify ROSE or TheNet model	

TEKK Data Radios and Filters

TEKK **KS-900L** 70 cm data transceiver (factory version) 2 watts, 430-450 MHz. Must specify exact frequency.	$ 149
TEKK **KS-1000L** 70 cm data transceiver (factory version) 5 watts, 430-450 MHz. Must specify exact frequency.	$ 159
TEKK **KS-900L-D192** (19200) Modified with Digital 'C' and Monolithic 21.4 filters	$ 199
TEKK **KS-1000L-D192** (19200) Modified with Digital 'C' and Monolithic 21.4 filters	$ 209
19200 filter kit (one C and two 21.4 monolithic filters)	$ 39

Accessories and Upgrades

Trimble GPS Antenna	$ 50
PacketPet for Windows Delivered on two 3.5 inch HD diskettes, plus manual Must supply callsign to be used for password generation	$ 79
MC-NB96 Internal DFM modem card to upgrade TINY-2, TNC-200, MFJ, etc. to 9600 bps operation Technical manual, schematic, connectors	$ 119
AD-4 with S Meter Function Specify if Header model (SPRINT-2) or 40 pin CPU plug-in model	$ 49
'Open Squelch DCD' adapters (specify model) DCD-3105 model (TINY-2/MICROPOWER-2) DCD-Header model (TNC/PC-320, TNC-200, any TNC with TAPR modem disconnect header) DCD-Universal model (has wire leads for connection)	$ 29
10 MHz Upgrade Kit for TINY-2/TNC-200 CPU, SIO, 100 ns EPROM, misc. Please specify model and version number of TNC	$ 25
APRS Port Switch (HSP Mode Switch) Fits PC with DE-9P, and TNC & GPS with DE-9S	$ 29
Heath Pocket Packet EPROM (HK-21) Upgrade Latest PacComm firmware, Installation Instructions, EPROM, Operating Manual, Command Reference Card	$ 50
Latest PacComm EPROM Must furnish TNC model	$ 29
128k RAM (memory) chip for user upgrade	$ 25
Manual set (any product except GPS) Operating/Technical Manual(s), schematic(s)	$ 10
Manual for Trimble SVee6-CM3 GPS receiver	$ 40

Cables

All RS-232 cables are $12 unless otherwise marked.

CBL-232M/M 25 pin male to 25 pin male , 8 conductor for TNC-200, MFJ etc. to dumb terminal with female DB-25.

CBL-232M/F 25 pin male to 25 pin female, 8 conductor for TNC-200, MFJ to PC/XT male DB-25, or as 'extension cable.'

CBL-925F/M 9 pin female to 25 pin male for TINY-2/ HandiPacket/TNC-320 to dumb terminal female DB25.

CBL-925F/F 9 pin female to 25 pin female TINY-2/ HandiPacket/TNC-320 to PC/XT male DB-25.

CBL-925M/M 9 pin male to 25 pin male for SPIRIT-2 to dumb terminal female DB25.

CBL-925M/F 9 pin male to 25 pin female for SPIRIT-2 to PC/XT male DB-25.

CBL-99F/F 9 pin female to 9 pin female for TINY-2/ HandiPacket/TNC-320 to PC/AT or laptop male DE-9.

CBL-99M/F 9 pin female to 9 pin female for SPIRIT-2 to PC/AT or laptop male DE-9 or as 'extension cable.'

CBL-99M/M 9 pin female to 9 pin female for SPIRIT-2 to female DE-9.

Prices do not include applicable taxes and shipping charges.

Repair Service

Repair service is available for units not in warranty.$35/hr plus parts and shipping.

Commercial Service Contracts

Call for information about service contracts and/or extended warranties for amateur products used in commercial service. Amateur units used in commercial service are not subject to any quantity discounts.

PacComm Warranty Policy

PacComm products are carefully designed, built, and tested to provide good value and long service.

All amateur radio products carry a 30 day money-back guarantee to allow you to return a unit which does not meet your requirements. Returned units must be in 'like-new' condition or a restocking fee will be applied.

All amateur products carry a 12 month factory warranty. This warranty does not apply to units used in commercial applications or which have been damaged by misuse or accident.

PacComm will repair or replace, at its option, any unit in warranty which is returned to the factory and found to be defective.

Prices subject to change without notice.
PacComm accepts VISA, MasterCard, Discover, American Express, and Diner's Club cards.
Call ourtoll-free order line to order. (800) 486-7388.

Personal checks will require 7 business days to clear before shipment. COD orders (USA only) must be paid in cash, cashier's check, or money order. Personal checks not accepted unless arrangements have been made in advance.

PacComm Amateur Products Order Form

If you live outside the United States, please submit your order to the nearest dealer or distributor in your country or area. Sending your order direct to Pacomm causes delivery delays. Orders placed from overseas for delivery within the USA may be sent to PacComm. All prices subject to change without notice. Dealer prices may vary.

Send this form with your check, money order, or credit card information (including expiration date) to:

PacComm Packet Radio Systems, Inc.
4413 N. Hesperides Street
Tampa, FL 33614-7618 USA

Note: Personal checks require 5-10 working days to clear before goods are shipped.

Credit card or COD orders may be placed via:

- Telephone Switchboard (813) 874-2980
- Facsimile (813) 872-8696
- BBS (813) 874-3078
- Orders (Toll Free) (800) 486-7388
- CompuServe Mail 76576,2003
- Internet: sales@paccomm.com
- World Wide Web http://www.paccomm.com

Name: ______________________________

Address: ______________________________

City, State/Province: ______________________________

ZIP/Postal Code: ____________________ Country: __________ __________

Telephone (circle whether Day or Evening): (Area Code) (________) ____________________

Payment: COD (USA only)(COD payment must be in cash, cashier's check, or money order. **NO personal checks)** ______________________________

CHECK MONEY ORDER Date: ____________________ Amount: ____________________

VISA MASTERCARD DISCOVER AMEX Card No: ______________________________

Expiration date __________:____________________Signature: ____________________

Quantity Ordered	Product Description	Price Each	Extended Price

- Florida and Ohio residents must add **sales tax.**
- **$6.00 Shipping fee** is for UPS surface within the Continental U.S. If you prefer another method, Circle your choice below and we will add the extra shipping charge to your total.
- **COD - $5.00** additional charge. **You must be available to accept and pay for a COD shipment. We will bill you for shipping charges on returned COD shipments!** Payments for COD must be in cash or cashier's check or money order. Personal checks not accepted without prior approval.

Total for Goods:	__________
Credit from prior order:	__________
Sales Tax (FL = 6 or 6.5%)(Ohio = 6.5 %):	__________
Shipping Charges (see note at left):	__________
Total :	__________

Shipping Instructions	UPS Surface	Express Mail	Standard Air Freight	Airborne Next Day
	UPS 2nd Day Air	Priority Mail	Rush Air Freight	Airborne Economy
	UPS 3rd Day	Parcel Post	FedX P1	Other (specify)
- Circle One	UPS Overnight	Surface Freight	FedX Economy	__________

PacComm Packet Radio Systems, Inc.
4413 N. Hesperides Street
Tampa, FL 66614-7618 USA
Facsimile: +(813) 872-8696
BBS: +(813) 874-3078 (V.34 with HTML)
e-mail: sales@paccomm.com
URL: http://www.paccomm.com
Toll Free Order Line: (800) 486-7388

Please contact us for additional information on the products in this catalog and on the many additional items shown on the price sheets which are not described herein. Check into our BBS or browse our web page regularly for the latest product information.

Communications Professionals: Contact PacComm for assistance with your Vehicle Tracking or other GPS positioning and RF data communication requirements. Ask for literature on our commercial and industrial products.